

PATENT ABSTRACTS OF JAPAN

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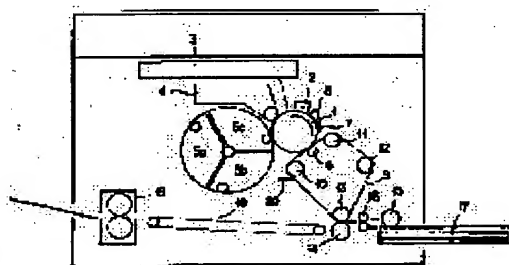
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(54) IMAGE FORMING METHOD

(57)Abstract:

PURPOSE: To reproduce a sharp black character and black line not having the decrease of a transfer rate, in an image forming device for making a full color copy by using an intermediate transfer body.

CONSTITUTION: In this image forming method for transferring a full color image in such a manner that a latent image formed on an image carrier is developed with charged color toner of yellow, magenta and cyan and black and each developed image is successively and primarily transferred to the intermediate transfer body 9 by a transfer means to which a voltage having a polarity opposite to that of the toner is applied to be superimposed and then secondarily transferred to another transfer material, the intermediate transfer body 9 has 108-1012 Ω cm semiconductivity, each image developed with yellow, magenta and cyan is transferred to the intermediate transfer body 9 and then, the image developed with the black toner is transferred to the intermediate transfer body 9.



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CLAIMS

[Claim(s)]

[Claim 1] Yellow and a Magenta which were charged in a latent image formed on image support, a color toner of cyanogen, And after developing negatives with a black toner, imprinting each developed image on a medium imprint object primarily and laying it on top of it one by one with an imprint means which impressed voltage of a toner and a reverse pole In an image formation method which formed a full color image by imprinting secondarily to other imprint material An image formation method characterized by imprinting a developed image by black toner on a medium imprint object after the above-mentioned medium imprint object's having the half-conductivity of 108-1012-ohmcm and imprinting each developed image by yellow, Magenta, and cyanogen on a medium imprint object.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the image formation method in color picture formation equipments which used the medium imprint object, such as an electrophotography copying machine and a printer.

[0002]

[Description of the Prior Art] Once imprinting primarily the toner image (developed image) formed on image supporters, such as a photo conductor drum, on medium imprint objects other than an imprint form as the image formation method (the imprint method) in color picture formation equipments, such as an electrophotography copying machine, the method of imprinting the toner image on a medium imprint object secondarily to up to an imprint form anew, and obtaining a copy image is learned.

[0003] And having the effect that generating of gap of the poor multiplex imprint by many factors, such as thickness of the maintenance condition of an imprint form and an imprint form and the front-face nature of elasticity and an imprint form, and color registration can be suppressed by using this method is known.

[0004] The image formation equipment shown in drawing 1 explains the conventional image formation method using this medium imprint object. In drawing 1, 1 is a photo conductor drum and rotates in the direction shown by the arrow head all over drawing. Opposite arrangement of the electrification machine 2, a photographic filter 3, the black toner development machine 4, the color toner development machines 5a, 5b, and 5c, the primary transfer roller 6, the photo conductor drum cleaner 7, and the **** lamp 8 is carried out from the hand-of-cut upstream of this in the location which counters the front face of this photo conductor drum 1 at order.

[0005] nine in drawing is the medium imprint belt arranged so that a part may contact the front face of the photo conductor drum 1 in a primary imprint location, and this is laid [firmly] across the surroundings of a drive roll 10, the Wolk amendment roll 11, a tension roll 12, and the back up roll 13 for a secondary imprint -- having -- **** -- up Norikazu -- degree transfer roller 6 is arranged inside the contact section to the photo conductor drum 1 of this medium imprint belt 9. Moreover, the secondary transfer roller 14 has countered the back up roll 13 for a secondary imprint.

[0006] The developed image by the toner imprinted by the medium imprint belt 9 according to an operation of the primary transfer roller 6 is imprinted in response to an operation of the secondary transfer roller 14 by the imprint form 17 fed with the feed roll 15 and the resist roll 16. And the imprint form 17 with which this developed image was imprinted is sent to a fixing assembly 19 with the conveyance belt 18, and it is fixed to it. 20 is a medium imprint belt cleaner which cleans the toner which remained on the medium imprint belt 9.

[0007] With the image formation equipment constituted as mentioned above, formation of an image is performed as follows. That is, the photo conductor drum 1 begins a revolution with a copy actuation start signal, the front face of the photo conductor drum 1 is charged in predetermined potential with the electrification vessel 2, and a latent image is formed with a photographic filter 3. This latent image moves according to a revolution of the photo conductor drum 1, and is developed by one of the black toner development machine 4 and the color toner development machines 5a, 5b, and 5c at the developed image by the toner of one color.

[0008] A medium imprint belt 9 is also running by the peripheral speed and ***** of the photo conductor drum 1 in accordance with the above-mentioned developed image formation actuation, the developed image by the toner on the above-mentioned photo conductor drum 1 which moved to the primary imprint location where the photo conductor drum 1 and the medium imprint belt 9 contact is imprinted by the medium imprint belt 9 according to an operation of the toner impressed to the primary transfer roller 6, and the electric field produced with the voltage of reversed polarity, and a primary imprint is performed.

[0009] On the other hand, it is removed by the photo conductor drum cleaner 7, the surface potential of the photo conductor drum 1 is discharged with the electric discharge lamp 8, and image formation actuation of the following color is equipped with the toner which remained on the photo conductor drum 1 at this time. The developed image full color on the medium imprint belt 9 by which the multiplex imprint was carried out is obtained by changing the color toner development machines 5a, 5b, and 5c, and repeating the above-mentioned process successively.

[0010] During actuation of the above primary imprint, it is estranged from the medium imprint belt 9 so that the secondary transfer roller 14 and the medium imprint belt cleaner 20 of a secondary imprint means may not disturb the developed image on the medium imprint belt 9, and the imprint form 17 sent out with the feed roll 15 is also standing by in the resist roll 16 neighborhood.

[0011] While the imprint form 17 is sent to a secondary imprint location with the resist roll 16 in accordance with

the developed image on the medium imprint belt 9 which the primary imprint ended moving to a secondary imprint location, the secondary transfer roller 14 contacts the medium imprint belt 9. And current is given to the back of the imprint form 17 according to an operation of the toner impressed to this secondary transfer roller 14, and the electric field produced with the voltage of reversed polarity, and the developed image on the medium imprint belt 9 is imprinted by this operation on the imprint form 17.

[0012] The conveyance belt 18 is adsorbed, the imprint form 17 which the secondary imprint ended is conveyed to a fixing assembly 19, and fixation is performed. The residual toner on the medium imprint belt 9 is removed by the medium imprint belt cleaner 20, and the next image formation actuation is equipped with it.

[0013] In the color electrophotography equipment using above-mentioned intermediate field, since the medium imprint belt 9 was charged whenever it repeats a primary imprint, there was a problem that the rate of a primary imprint became low. On the other hand, with the technology indicated by JP,4-319968,A, in order to prevent the clearness of a black alphabetic character and the linea nigra being lost by decline in this rate of an imprint, the method of developing and imprinting a black toner first is taken.

[0014]

[Problem(s) to be Solved by the Invention] However, when the conventional method mentioned above was used, it had the following problems. The medium imprint hair side of belt side has smoothness from paper etc. in order to prevent poor cleaning. Therefore, the adhesion force to the medium imprint belt of the toner of the developed image primarily imprinted on this medium imprint belt is weak compared with the adhesion force to paper, and the toner of the developed image primarily imprinted on the medium imprint belt is easy to carry out reverse transcription to the photo conductor drum 1 at the time of the imprint of the following color.

[0015] Therefore, first, whenever the toner of development / developed image imprinted primarily repeats the primary imprint of a developed image besides after that, reverse transcription of it is carried out, and its amount of toners eventually imprinted on an imprint form will decrease remarkably. Therefore, although shown in JP,4-319968,A, like, development / the amount of black toners which will be imprinted on copy material as mentioned above if it imprints primarily decreased remarkably, and the problem that the rendering of a clear black alphabetic character and the linea nigra was not obtained had generated the black toner first.

[0016] This invention aims at offering the image formation methods, such as a clear black alphabetic character which was made in view of the above-mentioned thing, and does not have decline in the rate of an imprint, and an electrophotography copying machine using the medium imprint object which enabled the rendering of the linea nigra.

[0017]

[Means for Solving the Problem] In order to attain the above-mentioned object, an image formation method concerning this invention Yellow and a Magenta which were charged in a latent image formed on image support, a color toner of cyanogen. And after developing negatives with a black toner, imprinting each developed image on a medium imprint object primarily and laying it on top of it one by one with an imprint means which impressed voltage of a toner and a reverse pole In an image formation method which formed a full color image by imprinting secondarily to other imprint material After the above-mentioned medium imprint object's having the half-conductivity of 108-1012-ohmcm and imprinting each developed image by yellow, Magenta, and cyanogen on a medium imprint object, he is trying to imprint a developed image by black toner on a medium imprint object.

[0018]

[work —] for By this image formation method, since a developed image by black toner is primarily imprinted after imprinting a developed image by yellow, Magenta, and cyanogen primarily on a medium imprint object, reverse transcription of the black toner is not carried out to image support which is a photo conductor. And when a medium imprint object has the half-conductivity of 108-1012-ohmcm, even if a primary imprint is repeated by this, this medium imprint object is not charged and development / rate of a primary imprint of a black toner imprinted primarily becomes good at the last.

[0019]

[An example of fruit **] An example of this invention is explained below based on drawing 2. In addition, in this example, the same configuration member as image formation equipment used for a conventional method shown in drawing 1 attaches the same sign, and omits explanation. In drawing 2, the black toner development machine 4 is arranged to a hand of cut of the photo conductor drum 1 at the downstream of the color toner development machines 5a, 5b, and 5c.

[0020] An example of this invention method is explained below using this configuration. The photo conductor drum 1 begins a revolution with a copy actuation start signal, the photo conductor drum 1 is charged in predetermined potential with the electrification vessel 2, and a latent image is formed with a photographic filter 3. A latent image formed on the photo conductor drum 1 moves according to a revolution of the photo conductor drum 1, any one of the color toner development machines 5a, 5b, and 5c approaches the photo conductor drum 1 first, and a latent image is developed with a color toner.

[0021] In accordance with the above-mentioned developed image formation actuation, the medium imprint belt 9 is also running by peripheral speed and ***** of the photo conductor drum 1. A developed image by color toner on the above-mentioned photo conductor drum 1 which moved to a primary imprint location where the photo conductor drum 1 and the medium imprint belt 9 contact The medium imprint belt 9 imprints and a primary imprint is performed with voltage of a toner impressed to the primary transfer roller 6, and reversed polarity, for example, an operation of electric field produced by +500-+3000V.

[0022] By changing the color toner development machines 5a, 5b, and 5c, and repeating the above-mentioned

process successively, after a developed image by color of 3 color piles is primarily imprinted on the medium imprint belt 9, a developed image by black toner is developed on the photo conductor drum 1 with the black toner development vessel 4, and, subsequently to the medium imprint belt 9 top, this is imprinted primarily. And a primary imprint image by superposition of each color on this medium imprint belt 9 is promptly imprinted primarily by the imprint form 17.

[0023] Each actuation of a secondary imprint to up to the imprint form 17 of this primary imprint image is still the same as formation of a developed image to the photo conductor drum 1 top by toner of each above-mentioned color and a primary imprint of a up to [the medium imprint belt 9 of this developed image], and the above-mentioned conventional thing. Moreover, the same is said of a front face of the photo conductor drum 1 being cleaned with the photo conductor drum cleaner 7 for every development of each color.

[0024] Although polyimide (PI), polyvinylidene fluoride (PudF), polyethylene terephthalate (PET), and a thing that mixed rheostatic control agents, such as carbon black (CB), in polycarbonate (PC), and set a volume resistivity to 107 - 1014-ohmcm were used for a material of the medium imprint belt 9 used in this example, that [its] this volume resistivity of whose is 108 - 1012-ohmcm by reason which is mentioned later was desirable. Moreover, since a mechanical strength is lacking and breakage on a belt crease, a tear, etc. occurs when thickness of this medium imprint belt 9 is 50 micrometers or less, it is necessary to make that thickness thicker than 50 micrometers.

[0025] In addition, measurement of a volume resistivity of the above-mentioned medium imprint belt 9 was performed by Mitsubishi Petrochemical Hi-Resta. An electrode used for measurement is HR probe, and used a volume resistivity when impressing voltage 100V for 30 seconds. Moreover, environment of a measurement location was maintained at temperature of 20-25 degrees C, and 50 - 60% of humidity RH, and after it left a medium imprint object belt to measure under this environment for 4 hours or more, it measured.

[0026] Using above image formation equipment, it copied in a commercial color copy form, and surface potential of the medium imprint belt 9 after a primary imprint at that time was measured. Using a Trek tabulation side electrometer (model344), for measurement of surface potential, the probe 21 was separated from the medium imprint belt 9 50-10mm, and was installed in a location which counters the tension roll 12 grounded as shown at drawing 3 at it.

[0027] Thus, when surface potential was measured, as shown in drawing 4, when a volume resistivity was higher than 1012-ohmcm, whenever it repeated a primary imprint, surface potential rose. If a copy image at this time is seen, in a color imprinted primarily later, concentration will be low, therefore a tint of a portion with which a toner more than a two color laps will have shifted.

[0028] On the other hand, when a volume resistivity was smaller than 1012-ohmcm, as shown in drawing 4, even if it repeated a primary imprint, surface potential hardly rose, but a good image also with small copy image and gap of tint of a portion with which a toner more than a two color laps, without concentration changing with colors was obtained. Moreover, since there was no reverse transcription of a black toner, a black alphabetic character and linea nigra were also reproduced good.

[0029] In addition, a volume resistivity is 108. Although surface potential did not rise even if it repeated a primary imprint, as shown in drawing 4 also when lower than omegacm, an image with it was not obtained. [severe spilling of a toner of a copy image and] [good] Since a charge given to the back of the medium imprint belt 9 spreads even besides imprint nip through resistance of the medium imprint belt 9 in the primary imprint section, this is because a toner will be imprinted by the medium imprint belt 9 from the photo conductor drum 1, before the photo conductor drum 1 and the medium imprint belt 9 contact.

[0030]

[Effect of the Invention] By the image formation method concerning this invention, the effect that a clear black alphabetic character without decline in the rate of an imprint and a linea-nigra rendering are obtained is done so.

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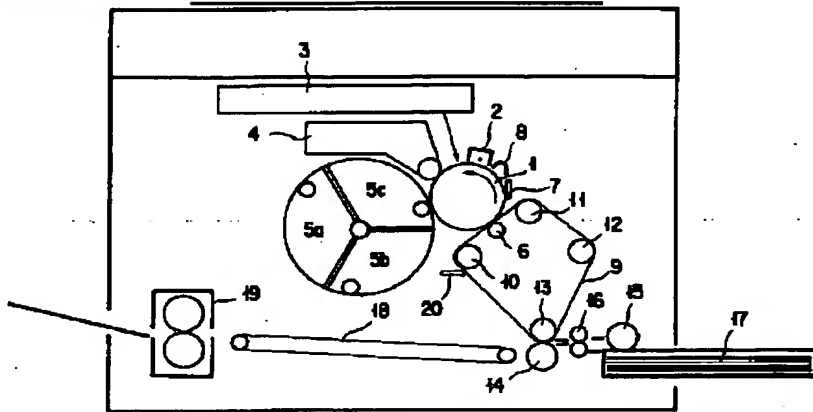
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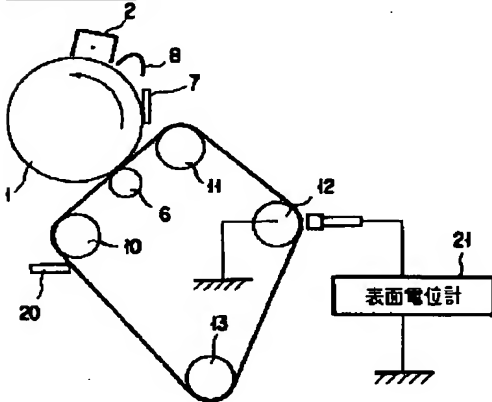
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DRAWINGS

[Drawing 1]

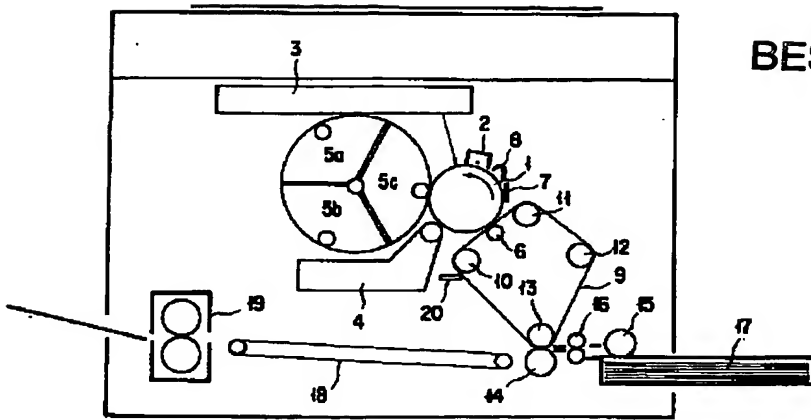


[Drawing 3]

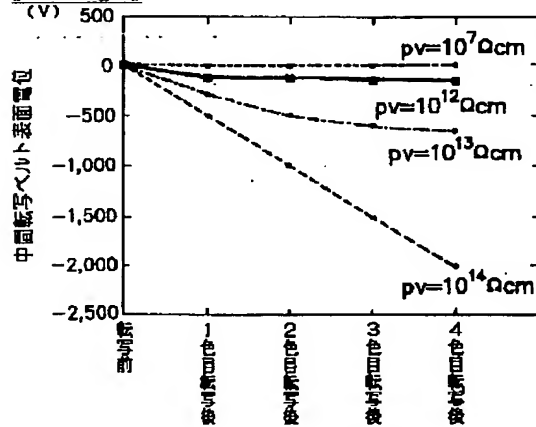


[Drawing 2]

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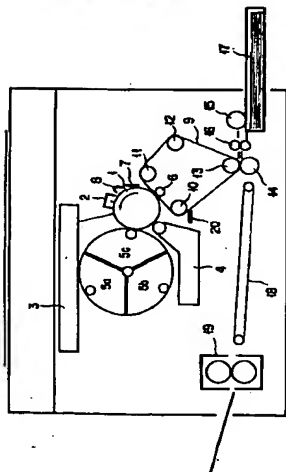


[Drawing 4]



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【図2】



【図4】

